

What is claimed is:

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1. A method for interfacing a user with a computer running an application program, the computer generating a graphical environment comprising a cursor and a graphical representation of at least a portion of a living body, the method comprising:
providing an object in communication with the computer;
controlling the cursor in relation to manipulation of at least a portion of the object by the user; and
outputting a haptic sensation to the user when the cursor interacts with a region within the graphical representation to provide the user with haptic feedback related to a simulated palpation of the region.
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2. A method according to claim 1 wherein the application program comprises a palpation training program that tasks the user to perform a simulated palpation procedure.
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3. A method according to claim 1 wherein the application program comprises a palpation training program that tasks the user to locate a predetermined target and wherein the region is associated with the target.
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4. A method according to claim 3 wherein the second haptic sensation comprises a scaled version of the first haptic sensation.
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5. A method according to claim 1 wherein the haptic sensation is a first haptic sensation and further comprising outputting a second haptic sensation when the cursor interacts with a second region within the graphical representation.
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6. A method according to claim 1 wherein the cursor comprises a graphical representation of at least a portion of the hand of the user.
7. A method according to claim 1 wherein the haptic sensation simulates a pulse of the living body.

8. A method according to claim 1 wherein the haptic sensation simulates a feature on or below the surface of the graphical representation.

5 9. A method according to claim 1 wherein the haptic sensation comprises a vibration.

10 10. A method according to claim 1 wherein the haptic sensation comprises a spring force.

11. A method according to claim 1 wherein the object comprises a mouse.

12. A method according to claim 11 comprising an actuator coupled to a housing of the mouse, the actuator operative to apply an inertial force that is transmitted through the housing to the user.

13. A method according to claim 12 wherein the inertial force is applied so as to simulate to the user the sensation of a pulse in the living body.

14. A method according to claim 11 wherein the mouse comprises a grounded linkage.

15. A method according to claim 14 further comprising an actuator capable of causing the grounded linkage to apply the haptic sensation to the user.

25 16. A method for interfacing a user with a computer running an application program, the computer generating a graphical environment comprising a cursor and a graphical representation of at least a portion of a living body, the method comprising:

providing an object in communication with the computer;

30 controlling the cursor in relation to manipulation of at least a portion of the object by the user; and

outputting a haptic sensation to the user when the cursor interacts with the graphical representation to simulate a pulse of the living body.

17 A method according to claim 16 wherein the application program comprises a pulse taking training program that tasks the user to take the pulse of a simulated patient.

5 18. A method according to claim 16 wherein the haptic sensation is a first haptic sensation output when the cursor interacts with a first region within the graphical representation and further comprising outputting a second haptic sensation when the cursor interacts with a second region within the graphical representation.

10 19. A method according to claim 18 wherein the second haptic sensation comprises a scaled version of the first haptic sensation.

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S* 20 20. A method according to claim 16 wherein the cursor comprises a graphical representation of at least a portion of the hand of the user.

21. A method according to claim 16 wherein the haptic sensation comprises a vibration.

22. A method according to claim 21 wherein the haptic sensation comprises a substantially sinusoidal waveform.

23. A method according to claim 16 wherein the object comprises a mouse and further comprising an actuator coupled to a housing of the mouse, the actuator operative to apply an inertial force that is transmitted through the housing to the user.

25 24. A method for interfacing a user with a computer running an application program, the computer generating a graphical environment comprising a cursor and a graphical representation of at least a portion of a living body, the method comprising:

providing an object in communication with the computer;

30 controlling the cursor in relation to manipulation of at least a portion of the object by the user; and

outputting a haptic sensation to the user when the cursor interacts with the graphical representation to simulate a palpated feature on or below the surface of the graphical representation.

25. A method according to claim 24 wherein the application program comprises a palpation training program that tasks the user to perform a simulated palpation procedure.

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26. A method according to claim 24 wherein the haptic sensation comprises a spring force.

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27. A method according to claim 24 wherein the object comprises a mouse.

28. A method according to claim 27 wherein the mouse comprises a grounded linkage.

29. A method according to claim 28 further comprising an actuator capable of causing the grounded linkage to apply the haptic sensation to the user.

30. A method according to claim 27 wherein the mouse comprises a force or pressure detector.

31. A method according to claim 30 wherein the haptic sensation is output in relation a detected force or pressure.

32. A method according to claim 24 wherein there is no visual indication of the feature.

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33. A method according to claim 24 wherein the haptic sensation simulates a three dimensional contour of the graphical representation.

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34. A method according to claim 33 wherein the mouse is constrained to movement substantially in a plane.

35. A palpation simulator comprising:
a computer readable medium comprising a computer readable program including program instructions to cause a palpation simulation to be executed on a computer,

and to cause the computer to generate a cursor and a graphical representation of at least a portion of a living body;

an object in communication with the computer, at least a portion of the object being manipulatable by a user;

5 a sensor in communication with the computer and coupled to the object to detect a manipulation of the at least a portion of the object to control the cursor; and

an actuator coupled to the object to output a haptic sensation to the user when the cursor interacts with a region within the graphical representation, the haptic sensation simulating a palpation of the living body.

10 36. A palpation simulator according to claim 35 wherein the computer readable medium is a magnetic disk or a magnetic tape.

15 37. A palpation simulator according to claim 35 wherein the computer readable medium is a portable storage device.

20 38. A palpation simulator according to claim 37 wherein the portable storage device is a compact disk (CD).

25 39. A palpation simulator according to claim 37 wherein the portable storage device is a digital video or versatile disk (DVD).

40. A palpation simulator according to claim 35 wherein the computer readable medium is memory in the computer.

25 41. A palpation simulator according to claim 35 wherein the computer readable program is downloadable onto the computer readable medium over a networked connection.

30 42. A palpation simulator according to claim 35 wherein the object comprises a housing of a mouse.

43. A palpation simulator according to claim 42 wherein the actuator is coupled to the housing of the mouse, the actuator operative to apply an inertial force that is

transmitted through the housing to the user.

44. A palpation simulator according to claim 35 wherein the object comprises
a mouse.

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45. A palpation simulator according to claim 44 wherein the mouse
comprises a grounded linkage.

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46. A palpation simulator according to claim 45 wherein the actuator is
capable of causing the grounded linkage to apply the haptic sensation to the user.

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47. A palpation simulator according to claim 35 wherein the cursor
comprises a graphical representation of at least a portion of the hand of the user.

48. A palpation simulator according to claim 35 wherein the haptic sensation
simulates a pulse of the living body.

49. A palpation simulator according to claim 35 wherein the haptic sensation
simulates a feature on or below the surface of the graphical representation.

50. A palpation simulator according to claim 35 wherein the haptic sensation
comprises a vibration.

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51. A palpation simulator according to claim 35 wherein the haptic sensation
comprises a spring force.

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52. A palpation simulator according to claim 35 wherein the object comprises
one or more finger receiving portions so that the haptic sensation may be delivered to one or
more fingers of the user.

53. A palpation simulator according to claim 35 wherein the sensor
comprises a position sensor.

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54. A palpation simulator according to claim 53 wherein the sensor comprises a force sensor.

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